New England Orthoptera collected in late October and November include almost entirely the true ground-inhabiting forms, as the crickets and acridian locusts. These are confined almost entirely to the open, upland fields and pastures which retain their greenness longest and are most exposed to the warmth of the sun's rays throughout the day.

Orthoptera are everywhere less abundant in species as cold weather approaches, yet careful observations at this season are of no less importance, since much information can be gained concerning the habits and relative numbers of those hardier species which become the dominant forms late in autumn.

Notes on Mamestra trifolii Rott. and its Allies.

By J. B. Smith, Sc.D.

(With Plate XI.)

Mamestra trifolii is one of our common Noctuids and usually represented by a fair series in collections and a very few duplicates, because, occurring throughout the country, there is little or no chance for exchange. It is recognized as a somewhat variable species and as a rule two types are brought out in collections: one in which there is little or no contrasting maculation, the s. t. line not conspicuous, but moderately dentate and without preceding sagittate black dashes; the other in which there are strongly contrasting shades, s. t. line conspicuous, strongly dentate to form a W on veins 3 and 4, preceded by well-defined, sagittate black marks. In almost every reasonably good series the difference between these two extremes is easily bridged by apparently intermediate forms.

In my catalogue the species stands as *trifolii* Rott., with *chenopodii* Fab., *albifusa* Wlk., *glaucovaria* Wlk., and *major* Speyer as synonyms and *oregonica* Grt. as a variety.

Hampson refers the species to *Scotogramma* Smith, gives the same synonymy except that he omits *major* Speyer altogether, and adds additionally *verna* Esp., *saucia* Esp., *treitschkei* Bdv., *pugnax* Hbn., *farkasii* Tr., *intermissa* Wlk, *inquieta* Wlk, and *canescens* Moore.

Of these names, however, he deems the following worthy of special mention:

"Ab. 1 *farcasi.* Fore wing darker and more varigated."

"Ab. 2 *oregonica.* Greyer; fore wing more thickly irrorated with pale brown."

"Ab. 3 *treitschkei.* Fore wing with medial part of subterminal line defined by prominent dentate black marks on inner side."

"Ab. 4 *albifusa.* Fore wing tinged with rufous and with white suffusion on costal area and beyond post medial line, the subterminal line with prominent dentate black marks on inner side at middle."

The form figured on p. 29 as *trifolii* ♂, agrees very nearly with the uniformly marked type usually found in our collections, except that it seems to be rather darker than our ordinary forms. There is, however, a still darker form occurring in the Northwest, which has been quite generally called *oregonica* in collections—largely on my authority.

In rearranging my series of *Mamestra* I set aside all the examples of *trifolii* for closer study, and Dr. Barnes was good enough to send me his material—the whole small enough for so common a species. During his visit to me, Mr. F. H. Wolley Dod marked in my box two examples, one as representing *albifusa* Wlk., the other as representing *oregonica* Grt., both in agreement with Hampson's memoranda, and, as to the *albifusa,* the most extremely contrasting specimen in my collection.

In separating out this material I find I have almost no Pacific Coast specimens, and, on close examination, the single example of *oregonica* as named by Dod is obviously not *trifolii,* although the name may be correct. In other words, I am not sure of my *oregonica,* although it agrees generally with the description. I am certain, however, that the specimen represents a good species, and one that I propose to fix by figuring the male sexual structures, so that if at any time later typical *oregonica* become available for dissection, they can be compared structurally, if not autoptically, with the material now before me.

After separating the material under examination as nearly as possible into two series, I examined the ♂ abdomen of extreme forms and found two strikingly distinct structures. The contrasting form, *albifusa,* has at the base of the abdomen a

pair of hair pencils fitting into grooves at the sides; the harpes are only slightly asymmetrical, but the claspers are altogether unlike, that of the left side, seen from below, being practically lost, while that of the right side is fully developed. The uncus in this form is only slightly dilated toward tip. In the uniform, or *trifolii* series, the abdomen has neither hair pencil nor lateral grooves; the harpes are decidedly dissimilar, both claspers are well developed though entirely unlike, and the uncus is spatulate at tip.

Oregonica in genital structure resembles *trifolii* in that the abdomen has no hair pencils, but the claspers are hugely and irregularly developed, altogether unlike anything else examined.

Having determined the existence of two structurally distinct forms, I attempted to divide them upon superficial characters, choosing contrast and development of the W-mark in the s. t. line as a base. On this I succeeded in getting two very nice series, coincident in distribution; but on testing by genitalic structure I found it all wrong; some very nicely contrasting forms that should be *albifusa* by all superficial signs, proved structurally like uniformly marked examples that should be and were *trifolii*. Abandoning this base, I noted a slight difference in wing form; one type with primaries a little more drawn out and pointed than the other. This served better, and then, on close study of individual features, I noted that in some examples the reniform was symmetrical above and below, making a rather broad, kidney-shaped mark. In other examples the inner defining line slopes toward the middle, drawing the mark out into a somewhat conical form that breaks the reniform outline. I found also that this was accompanied by a somewhat more ovate orbicular, tending to draw to a point inwardly, and on this basis all my examples separated nicely, the genitalic and ornamental characters coming into agreement.

Unfortunately, I have no European examples for comparison at this time, so that I am unable to say whether our forms are identical with those from that country, or whether there is not more than a single species involved in that country. All that I

can do now is to call attention to the fact that very similarly marked species exist; that further critical study of the European forms is needed, and in this connection to fix the American forms designated by the names now in use in our collections.

Mamestra trifolii.

Tends to uniformity in color, and ranges from an even ash-gray to luteous gray, variable in the amount of powdering. There is little contrast in the ground color, but the relative distinctness of claviform and reniform is variable, and so is the distinctness of the W in the s. t. line. This may be only slightly marked, or extend distinctly to the outer margin, and may or may not be preceded by dark marks or shades; rarely, however, are the preceding marks black. The orbicular varies in size and somewhat in shape, but is never drawn inwardly into a point. The reniform is broadly and symmetrically kidney-shaped.

Forty-seven examples of this type are under examination, and they come from Massachusetts, New York, New Jersey, Connecticut, Illinois, Iowa, South Dakota, Colorado, Washington, New Mexico and Arizona, covering thus approximately the entire country.

The structure of genitalia has been sufficiently mentioned to be left to the figure for further details. Examples from the entire range of localities have been examined in the preparation of this figure.

Mamestra albifusa Wlk.

The primaries, especially in the male, have a distinctly mottled appearance and tend to lighter shadings in the median and s. t. spaces. The maculation is on the whole much more distinctly relieved, and the W-mark of the s. t. line is always prominent and extends to the outer margin. Sagittate marks always precede the s. t. line; but they vary much in distinctness, and range anywhere from brown to black. The peculiarities of the orbicular and reniform have been already described, the latter as a rule somewhat less contrasting than in the preceding.

Thirty-six examples of this type are at hand from Maine, Alberta, Manitoba, Colorado, New Mexico, Arizona, Texas, Middle California.

The single example from Maine is doubtful. It is a female, very contrastingly marked, labeled by Mr. Dod as typical *albifusa,* but with the wing form and almost the reniform of *trifolii.* It is the only specimen in the entire series that is at all doubtful, and I have left it here chiefly because it fills in every respect the requirements of Walker's *albifusa.* The most easily recognizable portion of the sexual parts without dissection is the uncus, which is readily seen in mounted specimens where the anal parts are somewhat expanded.

Mamestra oregonica.

I have one male from my own collection, Colorado Springs, VI, which I refer to this species, and with this I am inclined to associate three females from Denver and Durango, Colorado, out of the Barnes collection. The male, which agrees with Mr. Grote's description, is very uniform in ground, slightly reddish in tint, the maculation clear but not at all relieved. S. t. line pale, not at all shaded, with a small W on veins 3 and 4, not extending more than half-way through the terminal space. Orbicular large, incompletely defined. Reniform broadly kidney-shaped, like that of *trifolii.* The three females agree in essentials, but are darker throughout.

On the under side this species has a continuous extra-median line and a discal mark on all wings.

The male genitalia are remarkable by the abnormal development of the claspers, which are separable from the harpes to the base, and cannot be described better than by a reference to Figure 5 on plate.

A species which at first sight looks like an intensification of *oregonica,* and which I have at times named as such, I have now separated out under the term *morana.*

Mamestra morana n. sp.

Ground color a dull luteous fuscous, without contrasting colors or markings. Front protuberant, with an obscure transverse darker shading. Collar with a median and terminal transverse dusky line which is never conspicuous and often barely traceable. Thoracic disc a little powdered with whitish, patagia with an obscure submarginal line. Primaries with the maculation of *chenopodii,* but obscure, broken, without decided contrasts. The basal and median lines are geminate,

scarcely relieved against the dark ground. S. t. line slender, pale, usually broken, the outward dents on veins 3 and 4 usually small and never conspicuous, although in some examples they extend to the outer margin. There are no conspicuous preceding marks, sometimes not even a dusky shading although, as a rule, the latter is present. Claviform short, broad, with a smoky outline, not dark-filled. Orbicular varying in size, nearly round, outlined in smoky, sometimes with a dark center, usually concolorous. Reniform large, broad, a little constricted, not well defined, dusky. Secondaries yellowish, smoky at base, with a broad outer blackish border; fringes yellowish. Beneath, whitish or yellowish, powdery; with a continuous exterior dusky line crossing both wings and a tendency to a dark area in the s. t. space; primaries with a blackish lunule, secondaries with a black discal spot.

Habitat—Colorado: Denver, Glenwood Springs, Fort Collins in June and July; Wyoming; Yellowstone Park in July; Washington: no date nor definite locality; British Columbia: Rossland in July.

A series of ten males and eighteen females is at hand, and the specimens differ little except in depth of ground color. In some the maculation is scarcely at all relieved; in others it is as well defined as in the average *chenopodii.* The dull, smoky-luteous ground will serve to distinguish this form from its allies.

A characteristic feature is the dusky shade of the s. t. space beneath. This, in most cases, is a real band, while in all cases the shading is obvious.

In sexual structure the species is bizarre. The harpes are of the *trifolii* type, but the claspers are asymmetrical, compound and, on the right side, the outer process is bluntly and raggedly terminated. The figure must be referred to for a real understanding of this structure, which is almost exactly duplicated in an altogether different species, *M. ortruda,* which by its other features is referable to quite a different series of species.

Explanation of Plate XI.

Figure 1.—*Mamestra albifusa,* male.
Figure 2.—*Mamestra trifolii,* male.
Figure 3.—*Mamestra albifusa,* female.
Figure 4.—*Mamestra trifolii,* female.
Figure 5.—*Mamestra oregonica,* male.
Figure 6.—*Mamestra morana,* male.